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GB A 2022673
GB A 2020711
GB A 2000537
GB 1466522
EP A1 0059119

(58) Field of search
E1D

(54) Insulating panel

(57) A reinforced constructional panel comprises a three dimensional matrix of metal members (211,221) and one or more in-fill members (212,222) of insulating material housed within the matrix. The panel may be faced with flat metal meshes (213,223). The insulating material may be expanded polystyrene

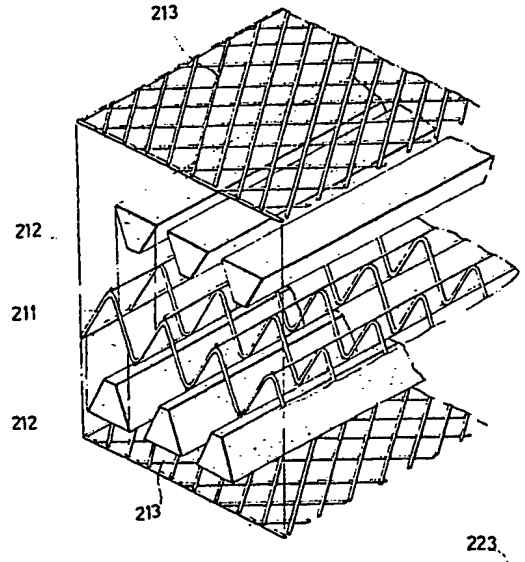

FIG. 2-1

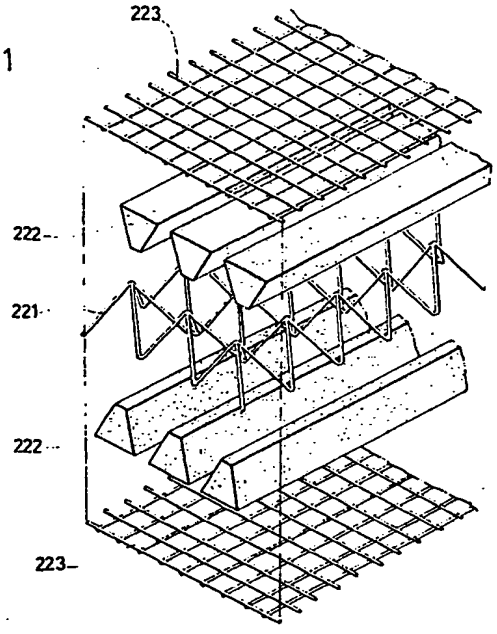

FIG. 2-2

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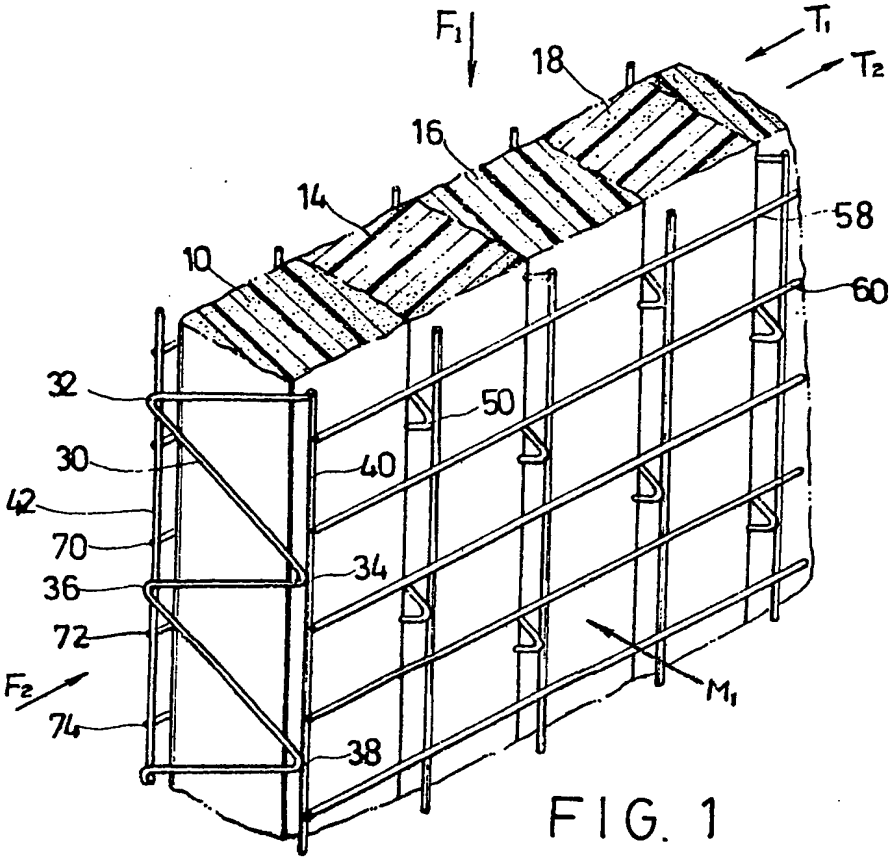

FIG. 1

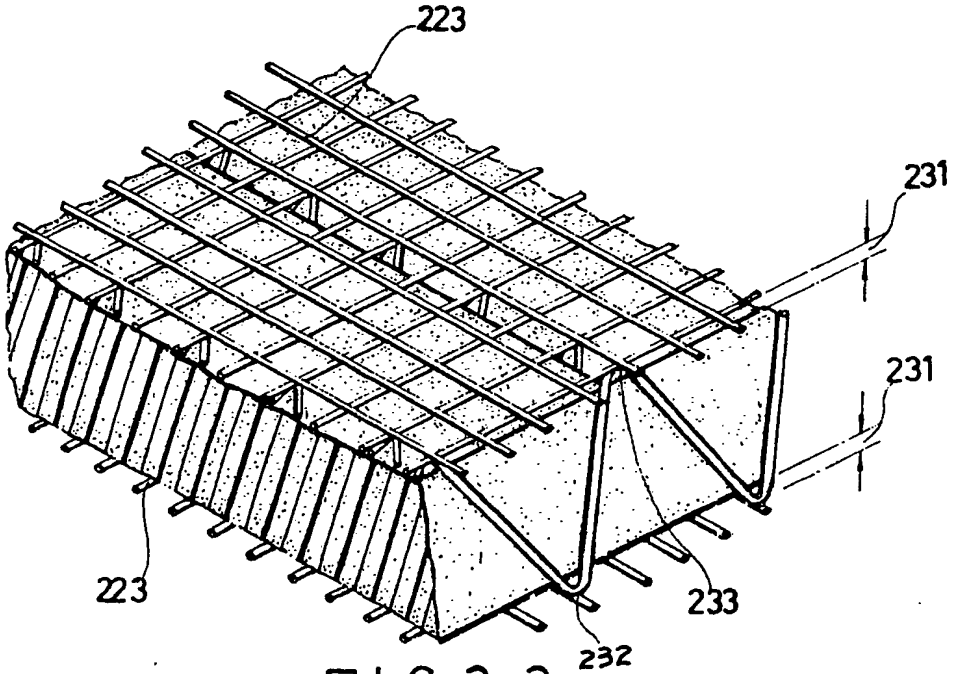

FIG. 2-3

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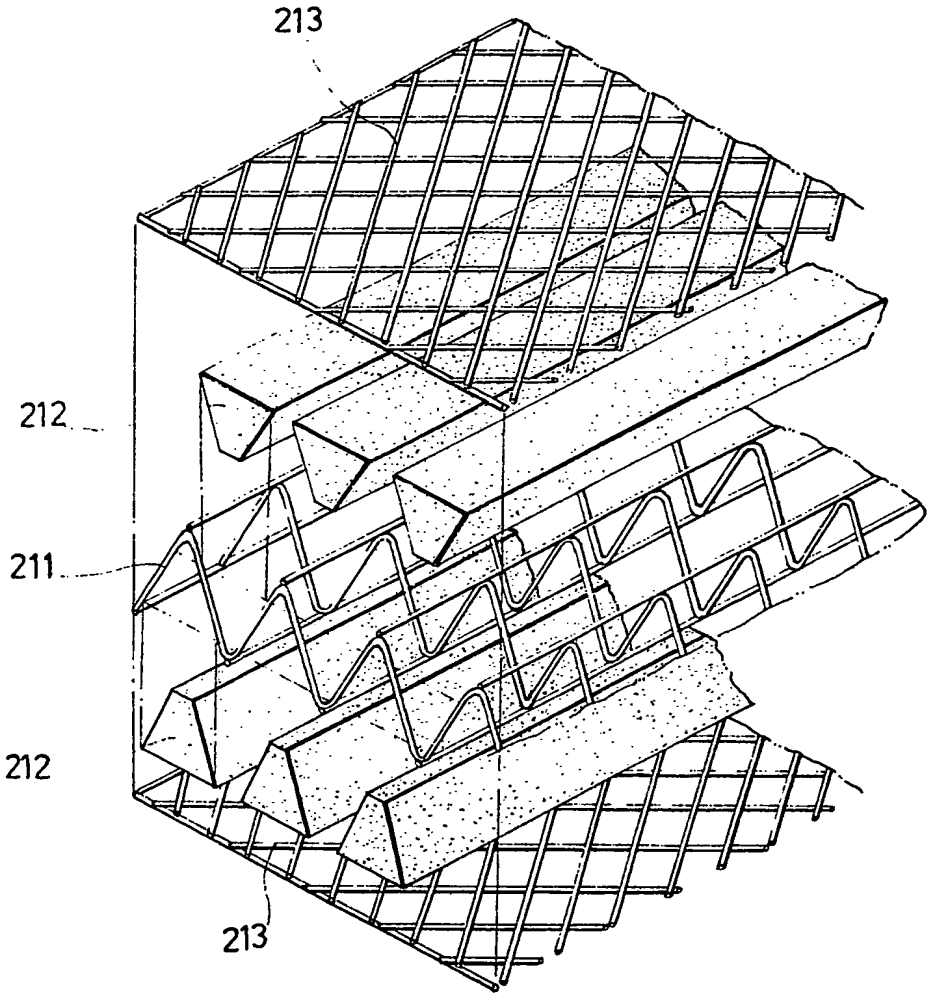

FIG. 2-1

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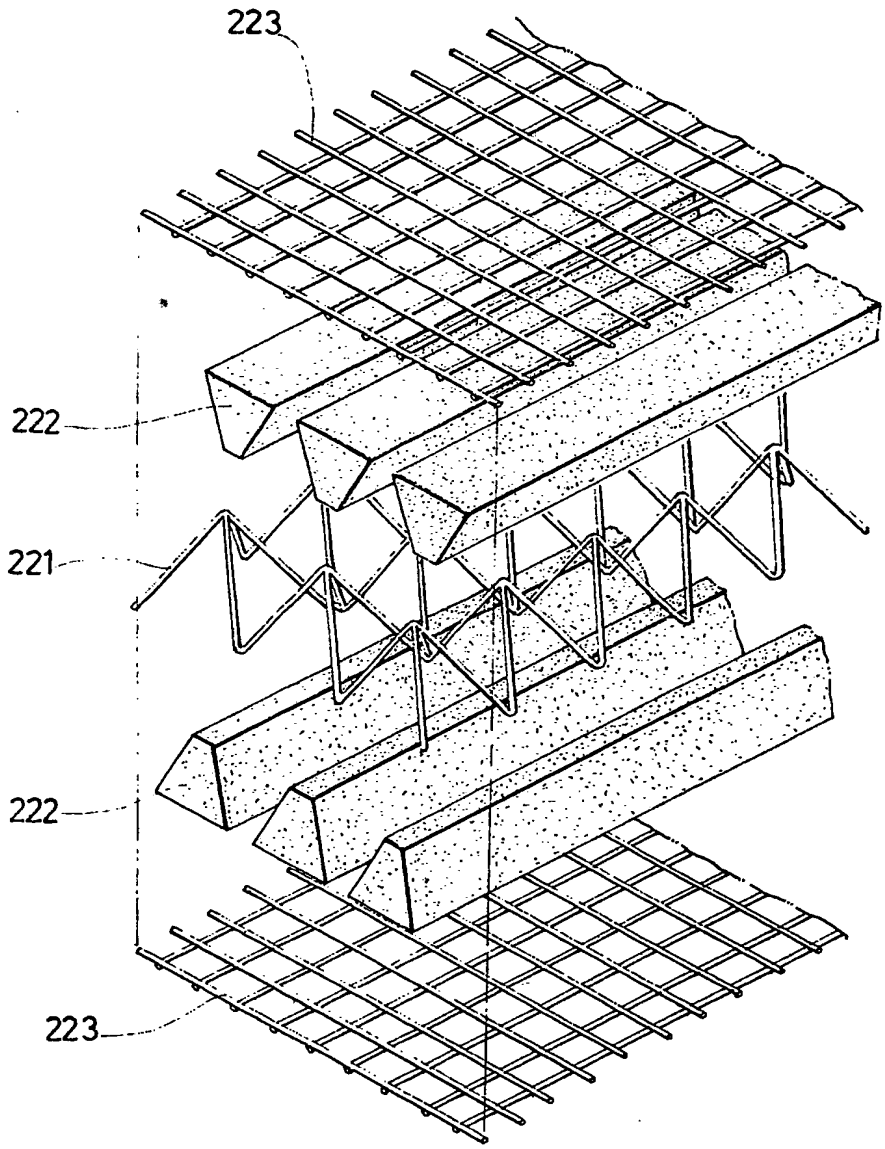

FIG. 2-2

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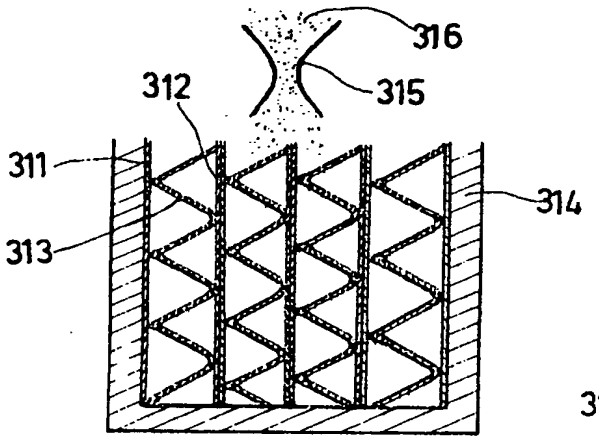

FIG. 3-1

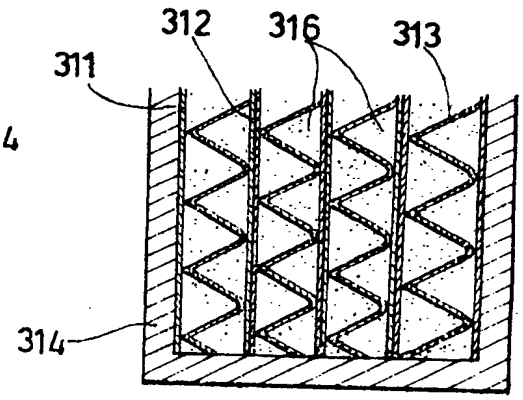

FIG. 3-2

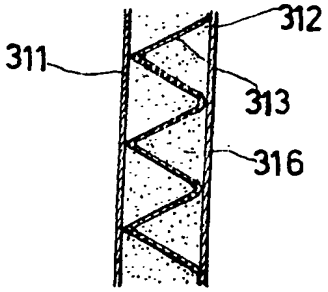

FIG. 3-3

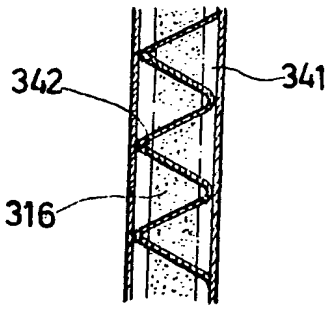

FIG. 3-4

SPECIFICATION

Multi-reinforced construction panel

Background of the invention

The present invention relates to a multi-reinforce construction panel, more particularly to which panel fabricated from wire-mesh or metal plate folded to specific configurations, such as acute V formations, square wave formations, natural wave formations, or trapezoidal formations, etc., and the lightweight materials inserted onto the loin section of the foled mesh or plate, also two flat wire meshes were welded to cover on the both sides of the forming skeleton to form into a space matrix framework.

As in the prior art convention the panel framework is constructed by the embodiment of a large number of wire truss and at the interior of matrix is filled with a body of unicellular rigid form materials reinforced with iron linings and strings or wires. However, as the structure panel made in accordance with the procedure set forth in the foregoing are found to be not immune to such drawbacks as cited below: Firstly the panel framework can only stand the compression F_1 and moment M_1 from the two directions as shown in Figure 1, the same panel framework cannot stand the compression F_2 and torsion T_1, T_2 from the directions as shown in Figure 1 the rigid foam material as the substructure thereof will easily susceptible to loosening, secondly, the frequent and multiple joint points between the components comprising said three-dimensional framework will be a much too complicated processing and production procedure because their link as concrete mass depends entirely on welding spot joints and connection areas, more specifically the rigid foam elements as constituent materials will have to firstly be made into strips for lining up side by side before the point-welded forming three-dimensional skeleton framework then be pressed against the outside of the rigid foam material laying side by side.

Summary of the invention

In accordance with a preferred embodiment of the present invention, light-weight thermal insulation material was inserted onto the back and loin sections of the folded metal wire mesh or plate structure formed. According to the invention then take two flat metal wire meshes profiled like two flat boards will be used to cover on the both sides of the framework, to follow that, welding spot technique will be employed to combine the two flat metal meshes with the folded mesh or plate inserted with light-weight thermal insulation into embodiment. The object of this invention is to take advantages of folded plates and space frame structure to provide a multi-purpose construction panel such that the construction embodiment can withstand compression, tension, and bending stress.

Another object of this invention is to provide by precasting production achieved of thermal and sound insulating properties and impervious to the passage of moisture and vibration-resistance performance at lightest possible weight compositions.

These and other objects of the present invention will be more apparent by illustrating preferred embodiments with reference to the following drawings.

Brief description of the drawings

Figure 1 is a perspective view of a light-weight construction board in the prior art.

Figure 2-1, 2-2, 2-3, is the perspective view of the component Element which will compose of multi-reinforce construction panel according to the present invention.

Figure 3-1, 3-2, 3-3, 3-4, is the molding process procedure for the practical case according to the present invention.

Detailed description of the drawings

As shown in Figure 1, whereof a reinforce modular foam panel which forming two dimensional matrix framework is bent to take formations by the bending and deflection treatment of curved wires 30 that are a little bit harder in property, the top points such as 32, 34, 36, 38 formed as they are by alternative settings are secured to a curved stem wire 30 by welding and joining techniques as executed to a pair of side rods or metal wires 40, 42, parallel and from each other, pointwelded to the top points on the reverse sides of the curved stem 30, for instance stem 40 is attached by points 34, 38, whereas stem 42 is attached by points 32, 36, thus accomplishing the framework of a sturdy, flat set, or two dimensional matrix framework secondarily by means of a number of foregoing matrix framework to bound each other which is composed of several by longitudinally intermittent intersecting separated bars 58, 60, and the corresponding bar which the same as by intermittent separated but along the matrix panel to fix. then each bar being welding spot to a side bar 40 as provieed on the sides of each lattice structure that altogether make up the whole framework and secured thereafter.

On the other side of the lattice there are provided a number of longitudinally intermittent intersecting bars all these additional multiple cross bars are point-welded to the lateral side 42 close to the second item corresponding to the other surface of each sub-structure this being done, the lattice structure will provide for the three-dimensional skeleton wrok of the whole structure, followed by the insert onto the light-weight raw materials 0, 14, 16, 18, therein.

Regarding the present invention, to put the invention to a completed status, the back and loin sections of the metal wire mesh structure formed according to the invention, will be inserted with light-weight thermal insulation raw material to be bonded in altogether. The inserting procedure can be performed in any of the three methods listed below:

Firstly, to stuff the light-weight thermal insulation material into the back and loin sections is after the formation of the folded metal wire mesh or

plate structure each of its own configuration. Then stuff with light-weight thermal insulation raw materials into embodiment, thereafter put two metal wire meshes cover up both sides of the folded mesh or plate, to follow that, welding spot process will be employed to combine the two flat metal wire meshes with the folded metal wire mesh or the folded plate. Referring to Figure 2-1, Figure 2-2, it is seen that the folded metal wire mesh 211, 221 structure which can be folded by press machine working structurally as a folded plates, the metal mesh can be folded into any shape whatever without losing such merits as resistance to torsions, resistance to shearing stress and compression stress application. or else the light-weight raw material 212, 222 may be inserted onto the folded metal wire mesh or plate structure 211, 221, separately with some clearance left 231 as shown in Figure 2-3 between the top and the bottom points 232, 233 of the metal wire mesh framework, to be completed by covering two flat metal meshes 213 as shown in Figure 2-1 or 223 as shown in Figure 2-2 and by the application of point welding techniques to embody it to the structural body of the metal mesh panel formed up earlier, there is one thing to note at this point, that is the fabric pattern of the two metal meshes can be chosen for structural purpose, and the mode to cover the metal wire meshes 211, 221 having flat panel profile over the framework completed of inserting of the light-weight raw materials can be such as to be parallel to the direction as formed by the original metal wire mesh panel as shown in Figure 2-2, 223, or be such that a miter crossing shape as 213 shown in Figure 2-1, cover up may be employed instead, before welding spot is applied such as is exemplified by Figure 2-1, and Figure 2-2, meaning to fortify its strength to resist stress due to shearing of bending endeavours uncalled for, A construction board incorporated according to the formation method described in the foregoing is illustrated in Figure 2-3. secondly, to stuff the light-weight thermal insulation material into the back and loin section of the metal skeleton is after the formation of the two flat set metal wire meshes together with the folded metal web boards (processed to give a particular configuration of its own such as an acute V formation, a square wave formation, a trapezoised formation,) over the cross section area, will be welded to come into a three-dimensional structure of a metal framework then to put the raw light-weight materials such as expanded polystyrene, or foamed PU strips and reinforced with bonding agents thereafter to substantiate a firm embodiment with the metal mesh structure. Thirdly, as shown in Figure 3-1 to Figure 3-4 that is adoption of molding process formation method, first of all for this process is the two flat metal meshes will be welded to the folded metal mesh or plate 313 to form the three dimensional skeleton to stand as a unit of its own. then the skeleton will be placed into the molding flask 314 as shown in Figure 3-1 thereafter by pouring cup 315 to pour the light-weight thermal insulation material.

CLAIMS

1. A multi-reinforce constructional panel comprising a metal wire mesh or metal plate folded to work structurally as a folded plate, with configuration as profile of an acute V formation, a natural wave formation, a square wave formation or a trapezoidal formation. Some light-weight thermal insulating raw materials will be inserted onto the section part of the foregoing folded wire mesh or plate framework. Finally, at both surface side of the folded framework inserted with light-weight thermal insulation material will be covered up with two pieces of flat metal wire meshes so as to make up a whole construction panel achieved of thermal insulating performances at lightest possible weight compositions, at same time, the two flat wire meshes and the folded wire mesh orpplate will be welded together to become a three dimensional skeleton which structurally works like a space frame to form a light and tough thermal insulation panel.

2. A multi-reinforced constructional panel according to claim 1, characterised in that the method of combination of light-weight raw materials to the metal wire-mesh structures can be the molding process made to accommodate filing of light-weight raw materials and additives of fire fighting agents or fire extinguishing agents and that upon completion of embodiment setting of the unit structure of metal wire mesh panel fed into the molding die, solvents or a practice of heat melting operation will be realised to erode the two surfaces of the construction panel, or else with heat melting method so as to maintain a clearance for coating cement plaster, stucco or gypsum for fire resistance and enforce the panel structurally.

3. A reinforced constructional panel comprising a three dimensional matrix of members and one or more in-fill members housed within the matrix.

4. A panel according to claim 3 wherein the matrix comprises at least two major members disposed in spaced relationship and interconnected by at least two transverse reinforcing members so as to define spaces within which the in-fill members are housed.

5. A panel according to claim 4 wherein the transverse reinforcing members are made from metallic material geometrically symmetrical and/or geometrically assymetrical shapes so as to structurally reinforce the panel.

6. A panel according to claim 4 or claim 5 wherein the transverse reinforcing members are made from sheets of metallic mesh.

7. A panel according to claim 4 or claim 5 wherein the transverse reinforcing members are made from metallic wire former to produce the geometrically symmetrical and/or assymetrical shapes.

8. A panel according to any one of claims 4 to 7 wherein each major member is a sheet of metallic mesh.

9. A panel according to any preceding claim wherein the in-fill material is a thermal insulation material.

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